

Figure 1. Vicinity map¹

Location: Southeast of Lanes Island, Casco Bay, Yarmouth, Cumberland County, Maine

Purpose: Standard lease for the suspended culture of American/eastern oysters (*Crassostrea virginica*), European oysters (*Ostrea edulis*), and hard clams (*Mercenaria mercenaria*)

Site Review by: Jon Lewis, Marcy Nelson and Flora Drury

Report Preparation by: Cheyenne Adams, Marcy Nelson, Flora Drury, and Jon Lewis

Report Submitted: April 2, 2020

¹Unless otherwise noted, all figures in this report were created in ArcMap version 10.6 using digitized NOAA Nautical Charts or geo-referenced aerial photographs provided by The Maine Office of GIS (*orthoCoastalCascoBay2018*).

Application Summary

The applicant is requesting 3.47² acres southeast of Lanes Island in Casco Bay for the suspended culture American/eastern oysters (*Crassostrea virginica*), European oysters (*Ostrea edulis*), and hard clams (*Mercenaria mercenaria*).³ The applicant proposes 10 360-foot rows of surface gear with 30 feet of space between rows. Each row would consist of either 50 floating Oyster Ranch™ cages (40" x 36" x 9") for the culture of American oysters or 50 floating mesh bags (24" x 24" x 8") for the culture of American and European oysters.⁴ Additionally, the applicant proposes a maximum of 20 bottom cages (24" x 24" x 8") for the culture of American oysters, European oysters, and hard clams that would be distributed between the rows of surface gear.⁵ American oysters would be transferred to this proposed lease site from an off-site overwintering location each May; hard clams would be transferred in the spring as environmental conditions allow.⁶ European oysters would be transferred to the site September through June from a wild source. The applicant anticipates being on site 2-3 times/week for seeding, maintenance, and harvest. No power equipment or tumbler is proposed for these operations.⁷

General Site Characteristics

Maine Department of Marine Resources (MDMR) Scientists Jon Lewis, Marcy Nelson, and Flora Drury assessed the proposed lease site on October 8, 2019. MDMR arrived on site at approximately 1:25 pm and the tide was ebbing.

The proposed lease occupies subtidal waters southeast of Lanes Island, in Casco Bay, Yarmouth (Figure 1). A marked navigational channel leading to the Royal River is to the southwest and Cousins Island is farther to the southwest (Image 1). The undeveloped shoreline of Lanes Island, northwest of the proposed site, features a rocky intertidal zone leading to mature forested upland (Images 2 & 3). At low water, mud flats extend from Lanes Island and the Freeport mainland to the north (Image 4) and open, yet shoal, waters are to the south and east (Images 5). Moshier and Little Moshier Islands are to the southeast (Images 6 & 7). The applicant's existing aquaculture operations were observed in the general vicinity at the time of MDMR's site assessment on October 8, 2019 (Images 3-5).

² Applicant originally requested 3.48 acres. DMR calculations, based on the application coordinates, indicate the area is 3.47 acres.

³ Application, pages 1-2

⁴ Application, pages 29-30 indicate 500 floating cages and bags, but the "Gear Table" on page 4 indicates a maximum of 300 floating cages and 200 floating bags

⁵ Application, pages 4 and 31

⁶ Application, page 8 indicates that shellfish will be stored in coolers at an off-site facility during the winter and no gear will remain on the site year-round, but the "Gear Table" on page 4 indicates that all proposed gear types will be deployed during winter

⁷ Application, page 7



Image 1. Looking southwest toward Cousins Island from south of the proposed SE corner (October 8, 2019).



Image 2. Looking northwest toward Lanes Island from south of the proposed SE corner (October 8, 2019).



Image 3. Looking north/northwest toward Lanes Island from south of the proposed SE corner (October 8, 2019).



Image 4. Looking north toward the applicant's limited purpose aquaculture sites and the Freeport shoreline from south of the proposed SE corner (October 8, 2019).



Image 5. Looking east from south of the proposed SE corner (October 8, 2019).



Figure 6. Looking southeast toward Moshier Island from south of the proposed SE corner (October 8, 2019).



Figure 7. Looking south toward Little Moshier Island from south of the proposed SE corner (October 8, 2019).

Depth

At the time of MDMR’s site assessment, depths ranged from 3.8 to 4.2 feet, sloping deeper from the NW corner to SE corner (Figure 2), as measured with a transom-mounted depth sounder at approximately 1:34 pm. The tide was ebbing with a predicted low at 2:12 pm (Table 1). Correcting for tidal variation derives depths approximately 6.55 feet higher (10.35 to 10.75 feet) at the nearest high tide and 1.84 feet lower (1.96 to 2.36 feet) at mean low water (MLW, 0.0 feet). Although the low water line on October 8, 2019 was predicted to be 1.64’ above MLW, the proposed lease site was observed to remain subtidal at low water during MDMR’s site assessment.

Table 1. Tide predictions for Great Chebeague Island, Casco Bay, Maine
(43.7217° N, 70.1417° W)⁸

Date	Time	Height (ft)
10/8/2019	1:56 AM	0.93 L
10/8/2019	8:12 AM	8.39 H
10/8/2019	2:12 PM	1.64 L
10/8/2019	8:26 PM	9.01 H

⁸ <http://tbone.biol.sc.edu/tide/tideshow.cgi>

Bottom Characteristics

MDMR staff observed the bottom characteristics of the proposed lease site via drop camera transects on October 8, 2019 (Figure 2). The sediment was classified using the Coastal and Marine Ecological Classification Standard, a national standard for describing features of the marine environment (Table 2). Sediments were categorized based on visual analysis of the drop camera video; no sediment samples were collected, or grain size analyses performed. The bottom of the proposed lease is predominantly a mud-sand mix with shell hash and occasional cobble (Image 8).

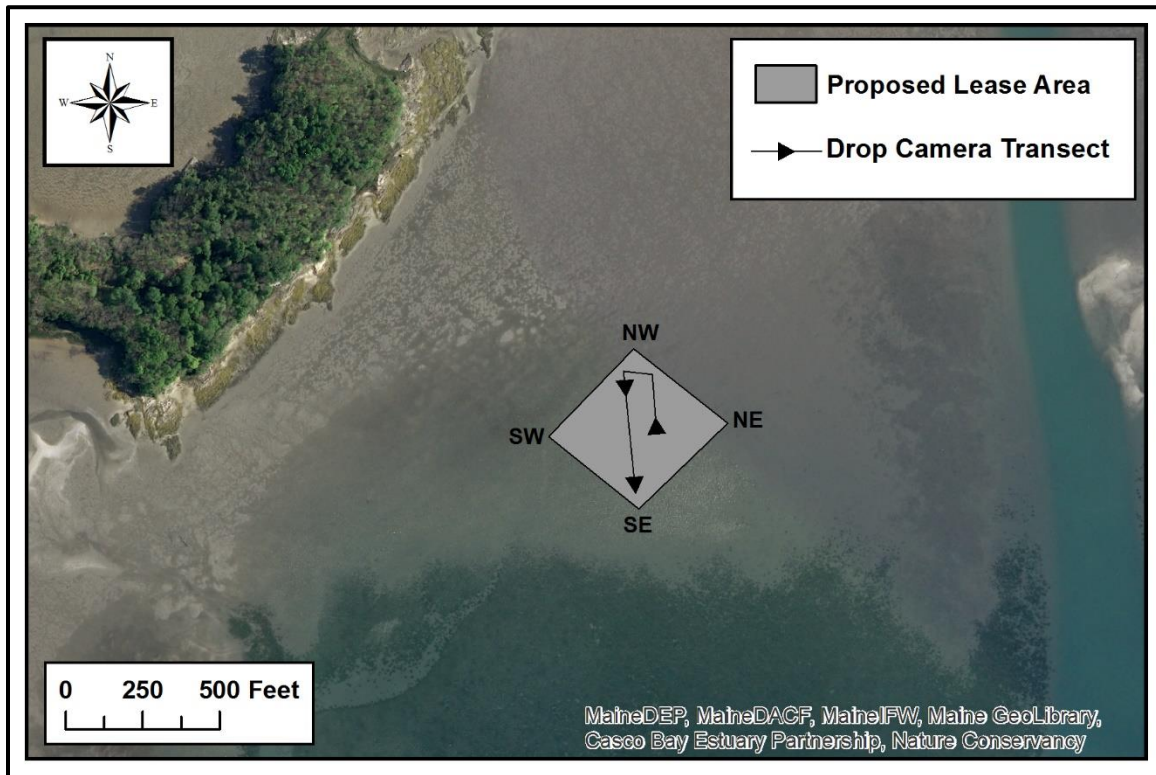


Figure 2. Approximate drop camera transects conducted on October 8, 2019.⁹

Table 2. Substrate classification on proposed lease site.

Substrate Origin	Substrate Class	Substrate Subclass	Substrate Group (Subgroup)
Geologic Substrate	Unconsolidated Mineral Substrate	Course Unconsolidated Substrate	Gravelly (Gravelly Muddy Sand)
Biogenic Substrate	Shell Substrate	Shell Hash	Clam, Mussel, and Oyster Hash

⁹ Aerial photograph provided by The Maine Office of GIS (*orthoCoastal/CascoBay2018*) and taken June 16 and 17, 2018 at approximate low tide. Low tide height was -1.66 feet on the 16th and -1.48 feet on the 17th (<http://tbone.biol.sc.edu/tide/tideshow.cgi>).

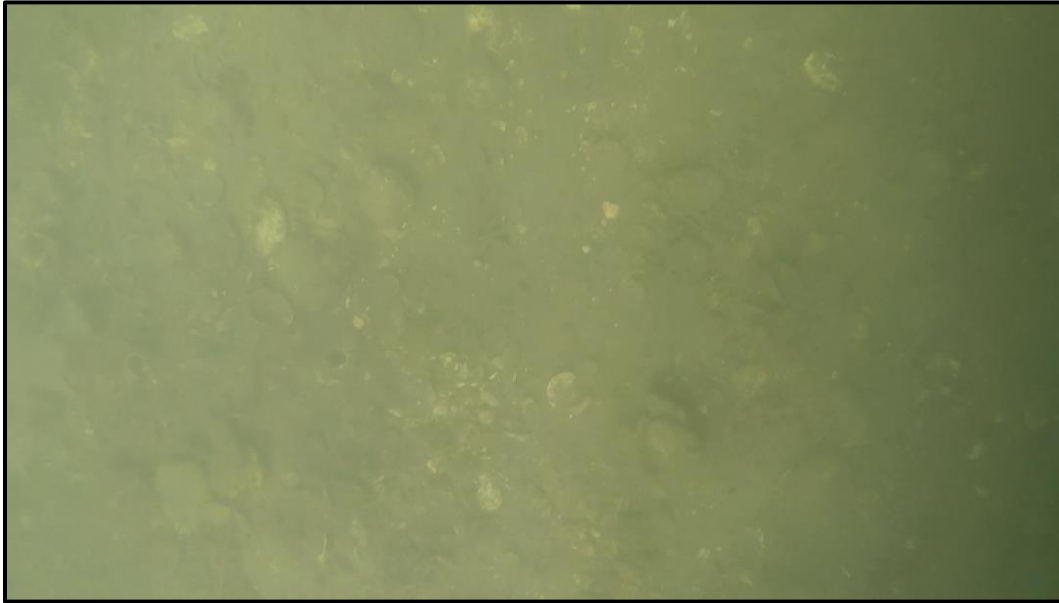


Image 8: Firm mud and sand with shell hash on the bottom of proposed lease site (October 8, 2019).

Position and Distances to Shore

POSAID Positioning Software was used to verify the distances and bearings between proposed lease corners. Distances to shore were determined using the measuring tool in ArcMap 10.6, digital orthophotography provided by the Maine Office of GIS, and the application coordinates (Figures 1 & 3).

Application Coordinates – 3.47 Acres (Figure 3)

<u>Corner</u>	<u>Latitude</u>	<u>Longitude</u>
NE	43.790631° N	70.118061°W then 389.58 feet at 307.53° True to
NW	43.791282° N	70.119231°W then 395.59 feet at 223.44° True to
SW ¹⁰	43.790494° N	70.120261° W then 375.99 feet at 128.00° True
SE ¹¹	43.789859° N	70.119139° W then 400.29 feet at 45.33° True to NE.

¹⁰ Labelled as SE corner on application pages 22, 23 and 30

¹¹ Labelled as SW corner on application pages 22, 23, and 30

Table 3. Approximate distances from the proposed lease to surrounding features (Figures 1 & 3). Measurements were made using digital orthophotography provided by the Maine Office of GIS (*orthoCoastalCascoBay2018*).

Feature	Distance
NW Corner to Lanes Island Rocky Shoreline, Nearest Point	~860 feet to the northwest
NE Corner to Crab Island, Nearest Point (~MLW)	~5,940 feet to the northeast
SE Corner to Little Moshier Island, Nearest Point (~MLW)	~3,310 feet to the southeast
SE Corner to Blaney Point, Nearest Point (~MLW)	~4,020 feet to the southwest
SE Corner to Royal River Channel, Nearest Point (~MLW)	~1,475 feet to the southwest
SW Corner to Lanes Island Rocky Shoreline, Nearest Point	~810 feet to the northwest
NW Corner to Tidally Exposed Flats, Nearest Point (~MLW)	>250 feet to the northwest

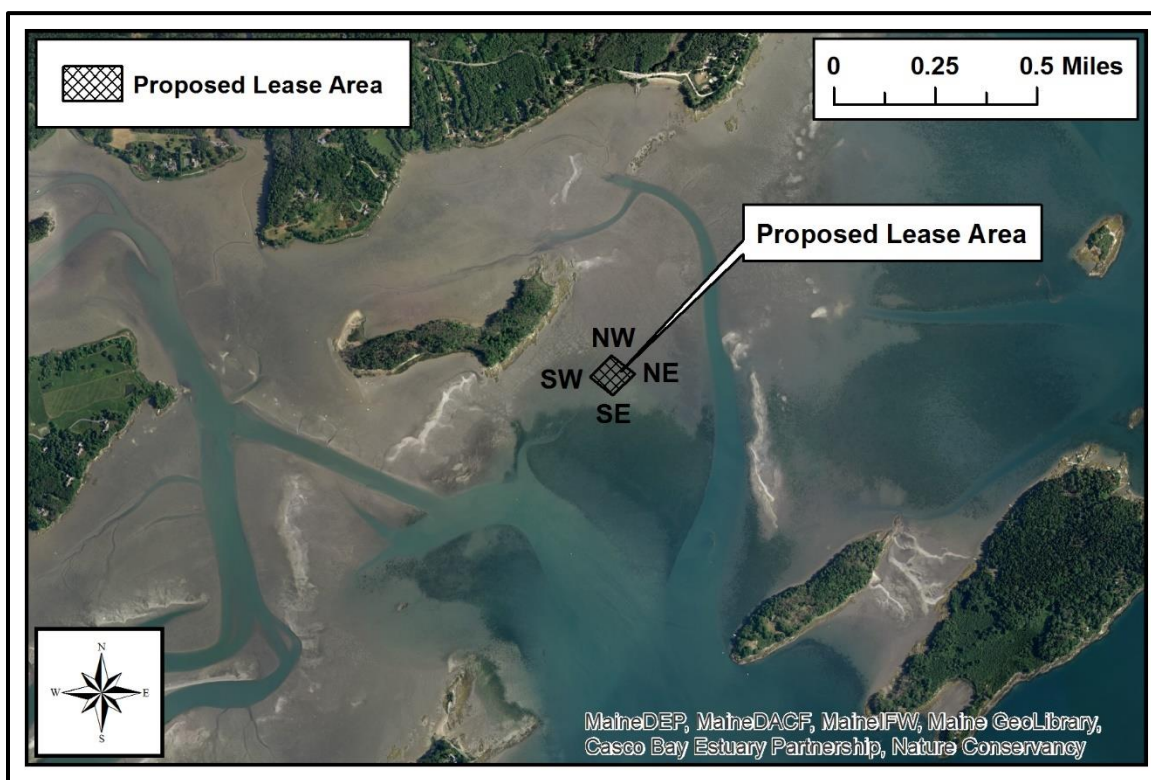


Figure 3. Proposed lease site and surrounding area.¹²

¹² Aerial photograph provided by The Maine Office of GIS (*orthoCoastalCascoBay2018*) and taken June 16 and 17, 2018 at approximate low tide. Low tide height was -1.66 feet on the 16th and -1.48 feet on the 17th (<http://tbone.biol.sc.edu/tide/tideshow.cgi>).

The criteria MDMR uses to determine the suitability of an aquaculture operation to an area (MDMR Regulations Chapter 2.37(1)(A)) are discussed, with respect to the proposal, below:

(1) Riparian Ingress and Egress

Lanes Island, owned by Maine Coast Heritage Trust, is an undeveloped island with two recommended landing sites and campgrounds; a sand beach is at the southwestern end of the island and a gravel beach is toward the north of the southeastern shoreline. The gravel beach, approximately 880 feet from the proposal, is reported to be accessible at mean low water¹³ but appears in aerial photography to be surrounded by exposed mud flats during a negative tide.¹⁴ Due to the shallow depth of this area, it is expected that most vessels utilizing the landing would be hand-powered or shallow draft skiffs. The distance between the landing and the proposed boundary is likely sufficient for depth-appropriate vessels to access Lanes Island unimpeded.

No docks or moorings were observed in the general vicinity during MDMR's site assessment on October 8, 2019.

(2) Navigation

The proposed lease location is approximately 1,475 feet (or just over ¼ mile) from a marked navigational channel leading to the Royal River. The channel can likely experience heavy vessel traffic due to the multiple boatyards present in the Royal River, but it is unlikely the proposed lease would impede vessel flow, if granted. The applicant notes that vessel traffic between the Royal River navigational channel and Winslow Park boat ramp occasionally travels through the proposed lease site during summer months.¹⁵ Given the ~3,310 feet of navigable water between the proposed lease and Little Moshier Island to the southeast, vessels travelling to and from Winslow Park boat ramp could likely navigate around the proposed lease site, if granted, with little alteration to their course.

The applicant proposes 30 feet between rows of suspended gear to allow for kayakers, boaters, and swimmers to navigate through the site.¹⁶ It appears that the applicant also proposes to deploy bottom cages measuring 8" in height between each row of suspended gear,¹⁷ which could present a navigational hazard in the shoal water at this site during low tidal stages.

(3) Fishing and Other Uses

MDMR staff observed approximately 15 lobster trap buoys in the deeper water to the south and southeast of the proposed lease site during the site assessment on October 8, 2019. The nearshore lobster fishery in Maine takes place during the summer and fall seasons due to the annual migration and molt cycle of lobsters (*Homarus americanus*). It is possible that lobster fishing activity occurs to a greater extent or in closer proximity to the proposed lease site at other times of the year than the site assessment was conducted. No recreational fishing was observed on October 9, 2019, but

¹³ <https://www.mcht.org/preserve/lanes-island/>

¹⁴ Aerial photograph provided by The Maine Office of GIS (orthoCoastalCascoBay2018) and taken June 16 and 17, 2018 at approximate low tide. Low tide height was -1.66 feet on the 16th and -1.48 feet on the 17th (<http://tbone.biol.sc.edu/tide/tideshow.cgi>).

¹⁵ Application, page 13

¹⁶ Application, page 14

¹⁷ Application, page 31

MDMR recognizes that this activity occurs largely during the summer months in Maine and, therefore, may not have been observed at the time of the site assessment.

The proposed lease site appears to remain subtidal at mean low water and, if granted, would not prevent access to the tidally exposed mudflats to the west and north. It should be noted, however, that the site is shallow enough at low water to allow for shellfish harvest by hand, rake, or small drag, and that European oysters were observed in abundance throughout the extent of the proposed lease. The applicant is not requesting exclusive use of the site, but the presence of surface and bottom gear would likely impact shellfish harvesting within the proposed lease boundaries.

Although MDMR Bureau of Public Health did not provide a comment on this proposal, a comment about shellfish resources was received for pending lease application docket #2019.10.31 S, which is located southwest of this proposal near Lanes Island. In an email dated September 24, 2019, Ari Leach (Area Biologist, MDMR) stated, “Will Owen, shellfish warden for Yarmouth, . . . said that most if not all shellfish harvesting activity around Lanes is around the NW corner (the horn)”.

(4) Other Aquaculture Uses

There are currently 2 active leases, 4 pending lease applications, and 20 Limited Purpose Aquaculture (LPA) licenses within 1 mile of the proposed lease (Figure 4 & Table 4). The closest active lease, CAS M1x, is a 2-tract, 3.55-acre experimental lease approved for the suspended culture of shellfish. CAS M1x is over 4,000 feet to the southeast, at the nearest point, and separated from the proposed lease site by Little Moshier Island (Tract 1) and Moshier Island (Tract 2). The recently issued lease CAS ELMx is also near the eastern shore of Little Moshier Island and approximately 4,100 feet from the proposal. A 6.59-acre standard lease approved for the bottom culture of shellfish (ROY LAM) is nearly 1 mile to the west.

Of the 20 active LPAs within the 1-mile buffer, 4 are currently operated by Maine Source Seafood shareholders (JORA119, JORA219, TJAG518, & TJAG618). The applicant does not plan to relinquish any LPAs if the proposed lease is granted.¹⁸

¹⁸ Application, page 10 states that LPAs TJAG719 and TJAG819 would be relinquished if the proposed lease were granted, but these LPAs were not renewed in 2020 and are no longer active.

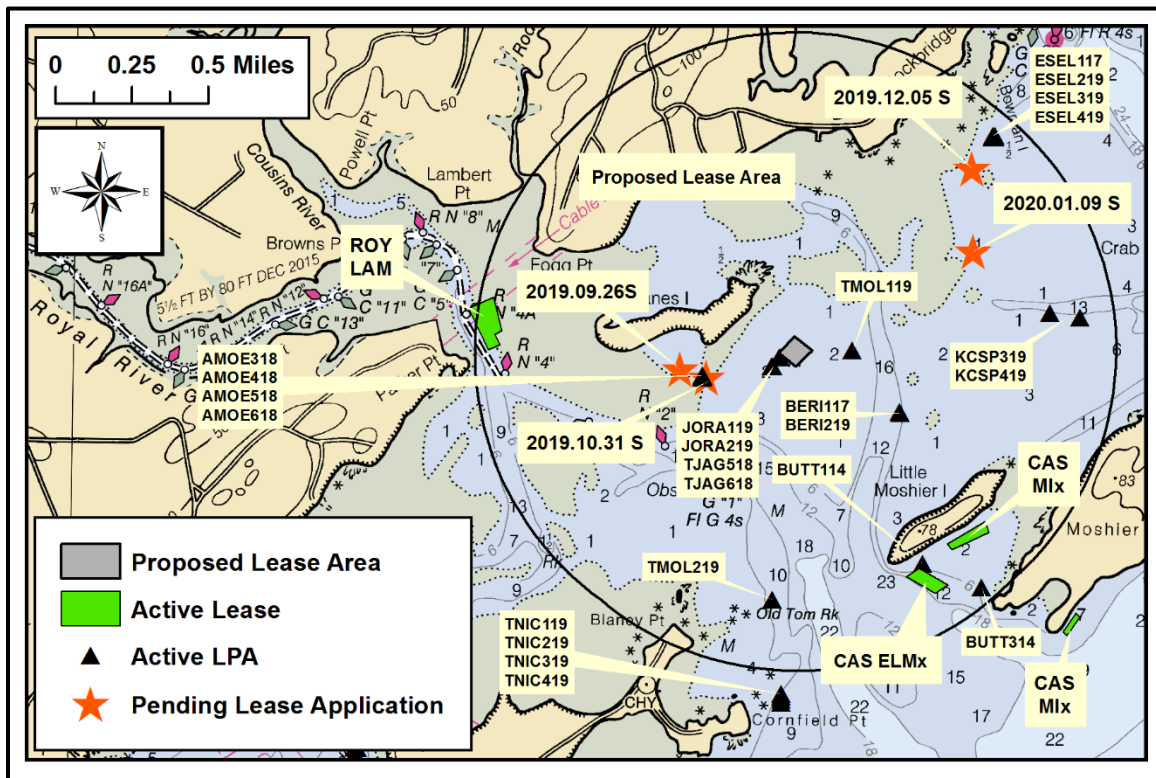


Figure 4. Aquaculture leases, Limited Purpose Aquaculture (LPA) licenses, and pending lease applications within 1 mile of the proposed lease area.

Table 4. Active aquaculture leases and pending lease applications within 1 mile of the proposed lease.

Lease Acronym/ Docket #	Approximate Distance from Proposal (ft)	Leaseholder/ Applicant	Acreage/ Proposed Acreage	Purpose/Proposed Purpose
CAS Mix	4,050	Keith Butterfield	3.55	Suspended Culture of Shellfish
CAS ELMx	4,100	Keith Butterfield	3.19	Suspended Culture of Shellfish
ROY LAM	4,820	Maine Oyster, Inc.	6.59	Bottom Culture of Shellfish
2019.09.26 S	1,700	Amanda Moeser	9	Suspended and Bottom Culture of Shellfish and Urchin
2019.10.31 S	1,300	Wolfe Neck Oyster Company LLC	8	Suspended and Bottom Culture of Shellfish
2019.12.05 S	4,200	Harraseeket Oyster Co. LLC	7	Suspended Culture of Shellfish
2020.01.09 S	3,200	Love Point Oysters LLC	4.78	Suspended Culture of Shellfish

(5) Existing System Support

On October 8, 2019, MDMR staff conducted drop camera transects within the proposed lease site to assess the epibenthic ecology of the area (Figure 2). The bottom is primarily comprised of firm mud and sand with cobble and shell hash. Epibenthic macro flora and fauna observed during the drop camera transect are described in Table 5. The European oyster (*Ostrea edulis*) was the dominant species observed throughout the underwater assessment (Image 9), along with a colonial tunicate (*Didemnum sp.*) to a lesser extent (Image 10). The American oyster (*Crassostrea virginica*) and common periwinkle (*Littorina littorea*) were observed rarely.

Table 5. Species observed via drop camera within the proposed lease site on October 8, 2019.

Species Observed	Abundance
European Oysters (<i>Ostrea edulis</i>)	Abundant
Colonial Tunicate (<i>Didemnum sp.</i>)	Common
American/Eastern Oyster (<i>Crassostrea virginica</i>)	Rare
Common Periwinkle (<i>Littorina littorea</i>)	Rare

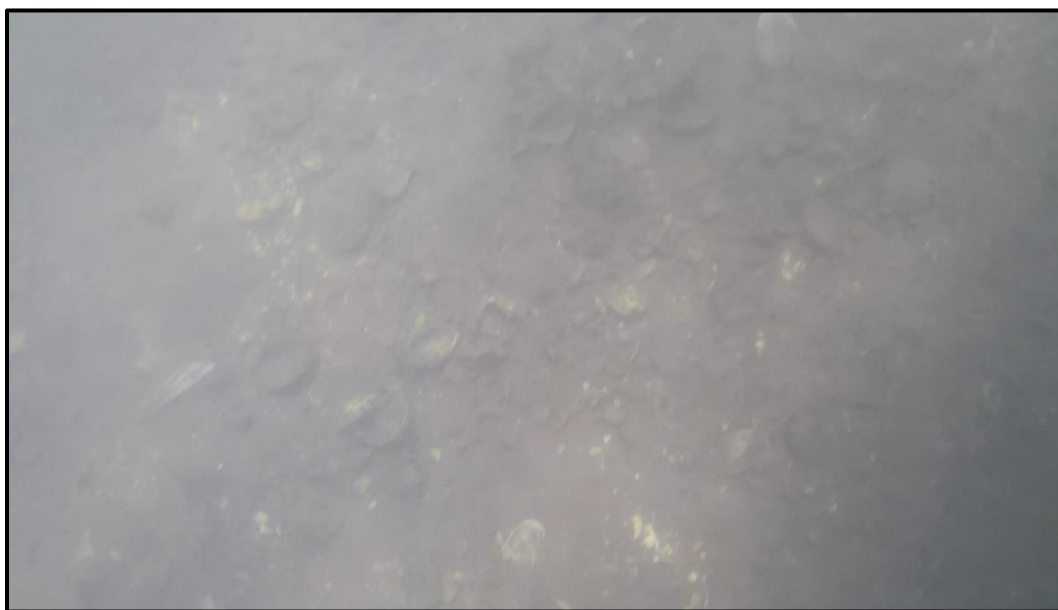


Image 9. European oysters (*Ostrea edulis*) observed on the bottom of the proposed lease site (October 8, 2019).

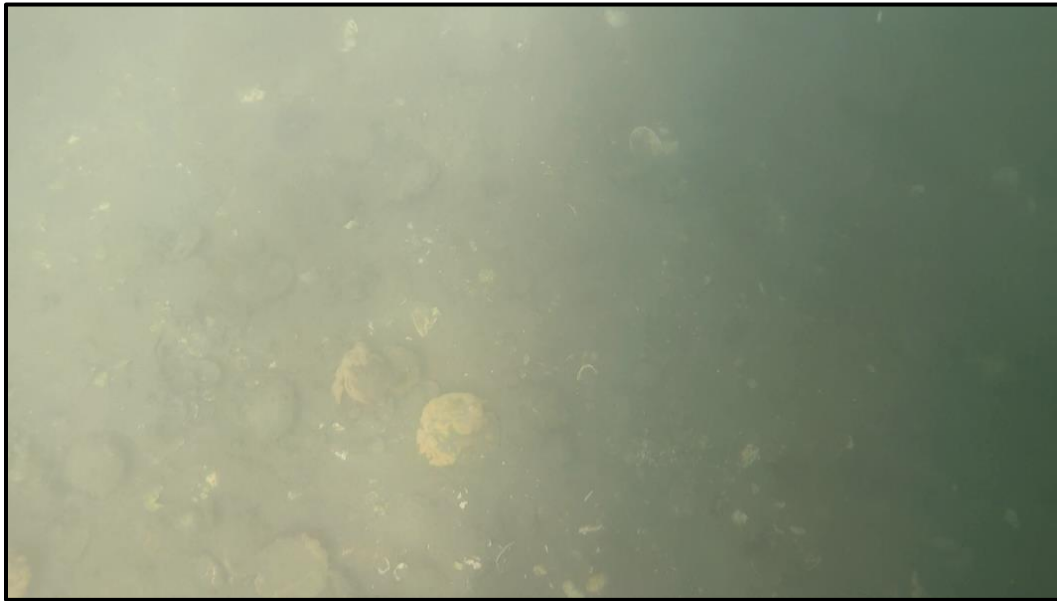


Image 10. Colonial tunicate (*Didemnum sp.*) observed on the bottom of the proposed lease site (October 8, 2019).

Eelgrass (*Zostera marina*)

The most recent eelgrass (*Zostera marina*) data, collected in 2018 by the Maine Department of Environmental Protection in cooperation with the Casco Bay Estuary Partnership, indicate the presence of a large, dense eelgrass bed approximately 155 feet to the south of the proposed lease site, at the nearest point. There are also extensive eelgrass beds mapped farther southwest and to the east of the proposed site. Of the four historical eelgrass surveys conducted in this area between 1992 and 2013, only data collected by MDMR in 2001 show a small portion of a low-density eelgrass bed within the proposed bounds of the lease (Figure 6). No eelgrass was observed during MDMR's underwater assessment conducted on October 8, 2019.

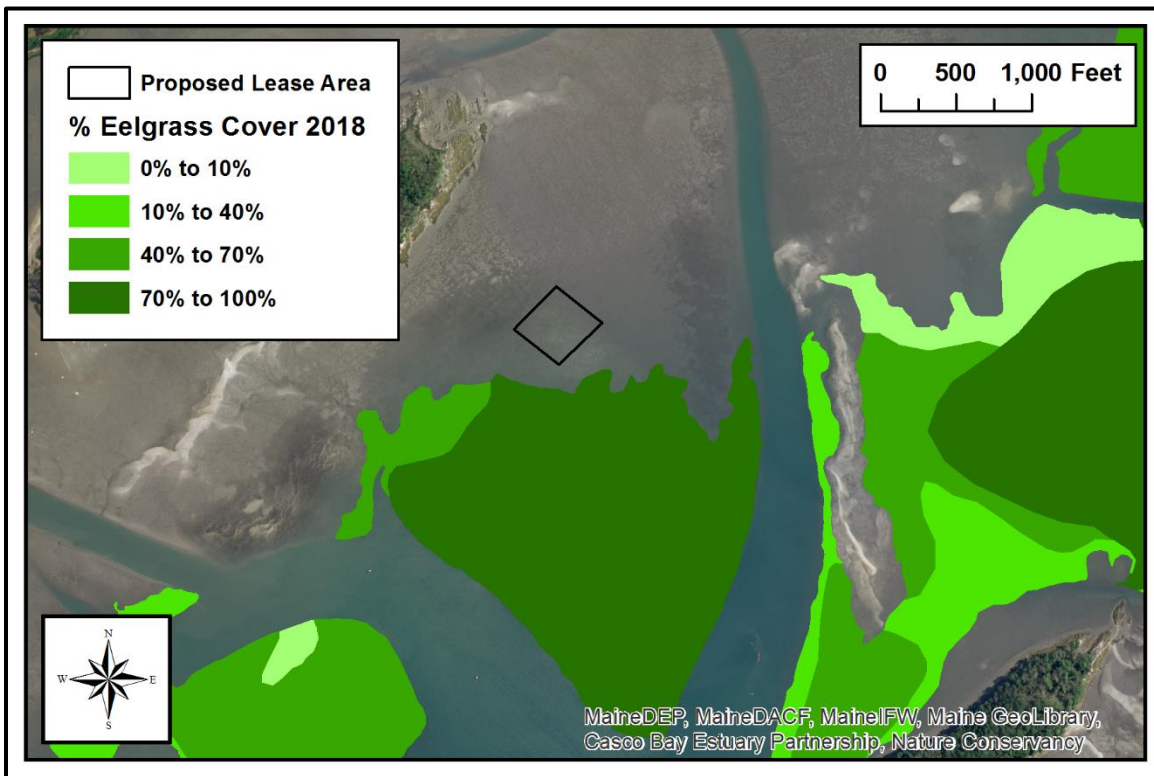


Figure 5: Eelgrass (*Z. marina*) near the proposed lease site, 2018.¹⁹

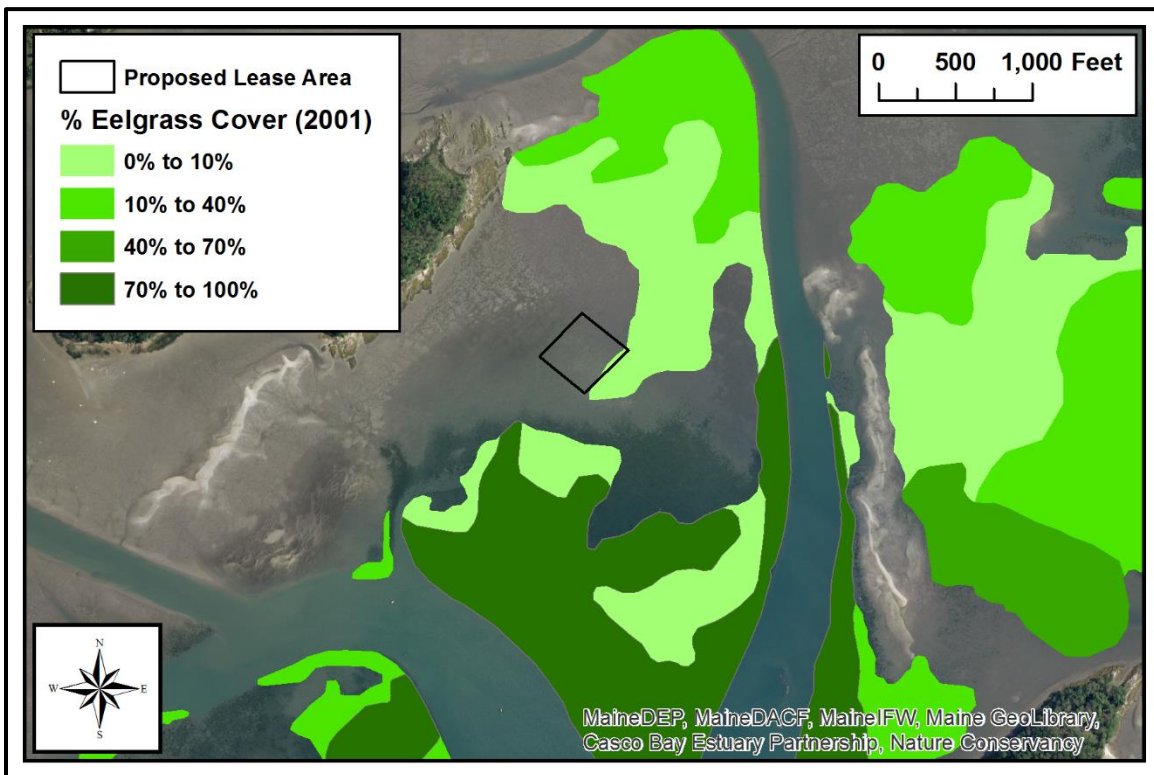


Figure 6: Eelgrass (*Z. marina*) near the proposed lease site, 2001.²⁰

¹⁹Data obtained from MDIWF maintained SDE Feature Class "GISVIEW.MEDEP.Eelgrass2018"

²⁰Data obtained from Maine Department of Marine Resources Open Data "MaineDMR – Eelgrass 2010"

Wildlife

According to GIS (Geographic Information System) data of Significant Wildlife Habitat maintained by the Maine Department of Inland Fisheries and Wildlife (MDIF&W) and available through the Maine Office of GIS, the proposed lease site is approximately 680 feet from tidal waterfowl and wading bird habitat (Figure 7). The nearest shorebird habitat is over 1.75 miles to the west.

On September 17, 2019 Rebecca Settele (Wildlife Biologist, MDIF&W) responded, by email, to a Request for Agency Review and Comment stating, “Minimal impacts are anticipated for this project.”

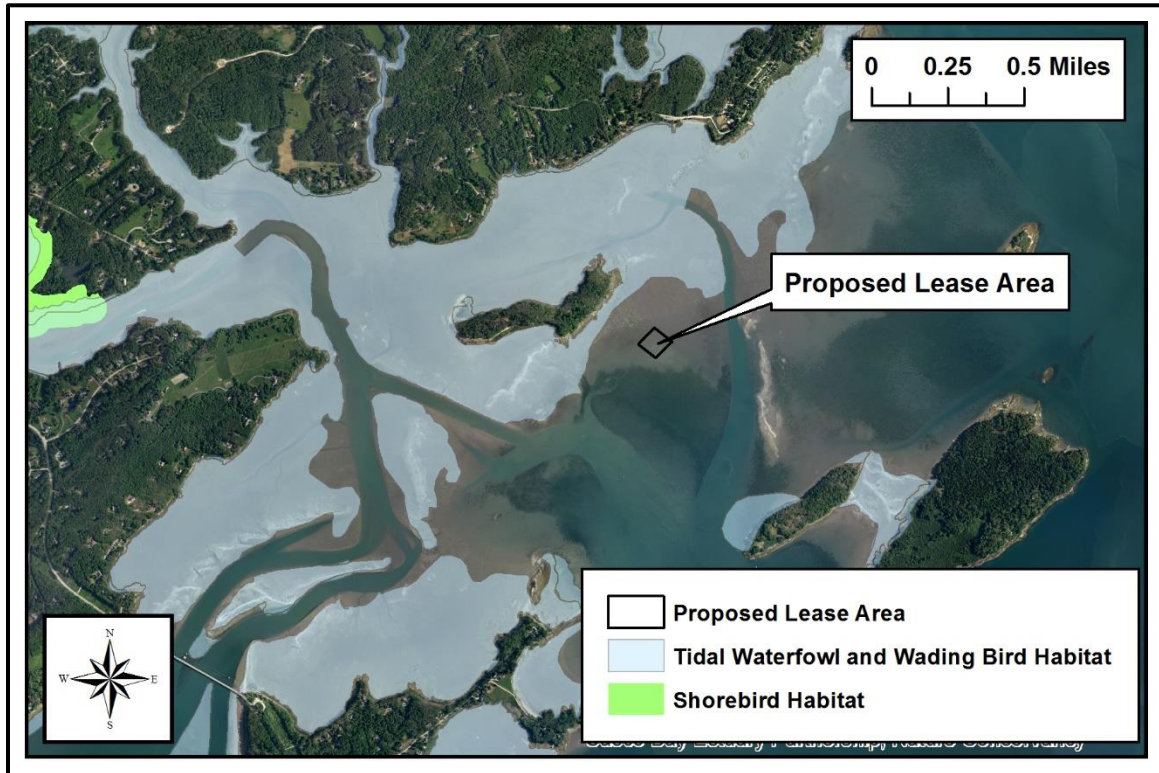


Figure 7: Tidal waterfowl and wading bird habitat²¹ and shorebird feeding, nesting, and staging areas²² near the proposed lease site.

(6) Source of Organisms to be Cultured

The sources of American/eastern oysters (*Crassostrea virginica*) and hard clams (*Mercenaria mercenaria*) include both Mook Sea Farm, located in South Bristol, Maine, and Muscongus Bay Aquaculture, located in Bremen Maine. Both hatcheries are approved sources by MDMR. European oysters (*Ostrea edulis*) would be collected from wild sources by a licensed harvester during open season, which would require a permit to be issued by MDMR for the movement of European oysters between waterbodies.²³

²¹ Data obtained from MDIWF maintained SDE Feature Class “GISVIEW.MEIFW.Twwh”

²² Data obtained from MDIWF maintained SDE Feature Class “GISVIEW.MEIFW.Shorebird”

²³ MDMR Regulations Chapter 24.10(4)(F)

(7) Interference with Public Facilities

There are no beaches, parks, docking facilities, or conserved lands owned by the federal, state, or municipal government within 1,000 feet of the proposed lease site (Figure 8). Lanes Island Preserve, within 1,000 feet of the proposal, is held in private conservation by Maine Coast Heritage Trust. The nearest public facility is the boat ramp at Winslow Park, over 3,300 feet to the north of the proposed NW corner. Although some vessel traffic associated with Winslow Park likely transits through the proposed lease site, navigation to and from this boat ramp would not be prevented by the proposed lease, if granted. Other public facilities in the general vicinity include Sandy Point Beach on Cousins Island, Sea Meadows Lane, and Spear Farm.

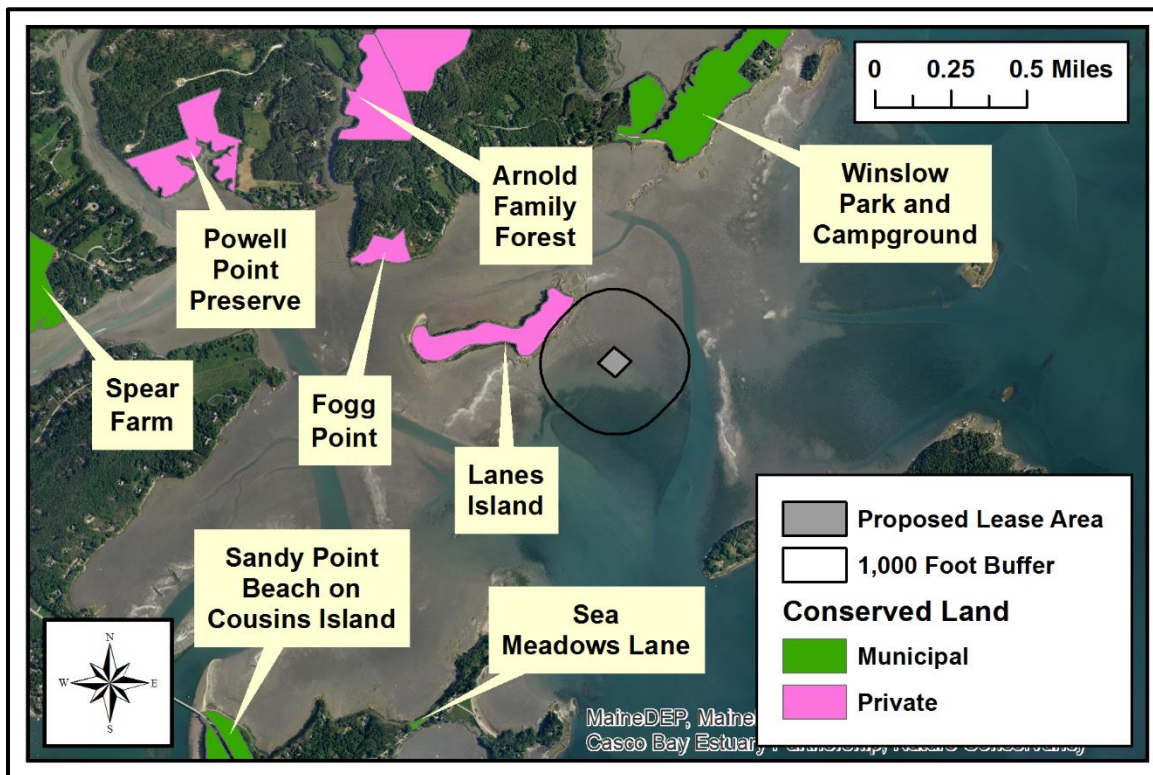


Figure 8: Public facilities near the proposed lease site.²⁴

(8) Water Quality

The proposed lease site is in Pollution Area 14, Section E-1 and is currently classified as “Conditionally Approved” by the MDMR Bureau of Public Health for the harvest of shellfish. This conditionally approved area is subject to closure following a malfunction or combined sewer overflow event at the Yarmouth Wastewater Treatment Plant.

(9) Lighting

The applicant does not propose the use of any lights on the lease site and does not anticipate any on-site work after daylight hours, with the exception of emergency situations.²⁵

²⁴ Data obtained from SDE Feature Class sourced from The Maine Office of GIS “GISVIEW.MECONSLANDS.Conserved_Lands”

²⁵ Application, page 9

(10) Noise

According to the application, no power equipment would be used on site for maintenance, grading, or harvesting and all activities would instead be performed by hand. The proposed operations would be conducted with flat-bottom vessels measuring 17 to 30 feet in length.²⁶ While the applicant does not provide specifications for the associated motors, the boats proposed are consistent with the size and type of vessels routinely used for aquaculture operations, as well as other commercial and recreational uses, along the Maine coast.

(11) Visual Impact

The proposal complies with the MDMR's height and visual impact limitations.

²⁶ Application, page 8